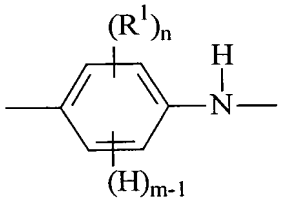
CLAIMS

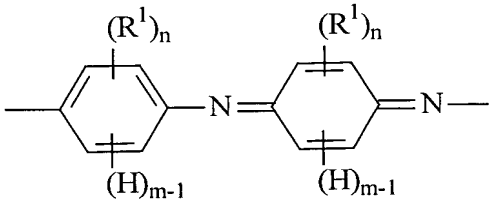
What is claimed is:

1. A composition comprising an aqueous dispersion of a polyaniline and at least one colloid-forming polymeric acid.

2. A composition according to claim 1, wherein said polyaniline has aniline monomer units having a formula selected from Formula II below and Formula III.



(II)



(III)

wherein:

n is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that n + m = 5; and

R^1 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms.

3. A composition according to claim 2, wherein m is 5.

4. A composition according to claim 1, wherein said colloid-forming polymeric acid is selected from polymeric sulfonic acids, polymeric carboxylic acids, polymeric acrylic acids, polymeric phosphoric acids, and mixtures thereof.

5. A composition according to claim 1, wherein said polymeric acid comprises a polymeric sulfonic acid.

6. A composition according to claim 5, wherein said polymeric sulfonic acid is fluorinated.

7. A composition according to claim 5, wherein said polymeric sulfonic acid is perfluorinated.

8. A composition according to claim 5, wherein said polymeric sulfonic acid is a perfluoroalkylenesulfonic acid.

9. A composition according to claim 8, wherein said polymeric sulfonic acid is perfluoroethylenesulfonic acid.

10. A buffer layer comprising polyaniline and a colloid-forming polymeric acid.

11. A buffer layer made from an aqueous dispersion of a polyaniline and at least one colloid-forming polymeric acid.

12. A buffer layer according to claim 11, wherein the aqueous dispersion has a pH greater than 3.5.

13. A buffer layer according to claim 11, wherein the aqueous dispersion has a pH greater than 5.

14. A buffer layer according to Claim 11, wherein said colloid forming polymeric acid is selected from polymeric sulfonic acids, polymeric carboxylic acids, polymeric phosphoric acids, polymeric acrylic acids, and mixtures thereof.

15. A buffer layer according to Claim 14, wherein said polyaniline is unsubstituted and said colloid-forming polymeric sulfonic acid is fluorinated.

16. A buffer layer according to Claim 15, wherein said colloid-forming polymeric sulfonic acid is perfluoroethylene sulfonic acid.

17. An organic electronic device comprising a buffer layer according to Claim 10 or 11.

18. An electronic device according to Claim 17, wherein the device is an electroluminescent device.

19. A thin film field effect transistor comprising at least one electrode comprising a polyaniline and a colloid-forming polymeric acid.

20. A thin film field effect transistor according to Claim 19, wherein said electrode further comprises metal nanowires or carbon nanotubes.

21. A thin film field effect transistor according to Claim 19, wherein at least one electrode is selected from gate electrodes, drain electrodes, and source electrodes.

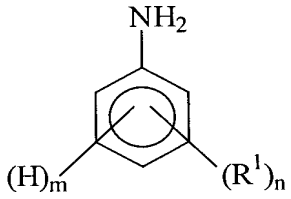
22. A buffer layer according to Claim 14, wherein said polyaniline is unsubstituted and said colloid-forming polymeric sulfonic acid is perfluorotheylenesulfonic acid.

23. A method for producing a stable, aqueous dispersion of a polyaniline comprising polymerizing aniline monomers in the presence of at least one colloid-forming polymeric acid.

24. A method of making an aqueous dispersion of polyaniline and at least one colloid-forming polymeric acid including the step of forming a combination of water, aniline monomer, colloid-forming polymeric acid, and oxidizer, in any order, provided that at least a portion of the colloid-forming polymeric acid is present when at least one of the aniline monomer and the oxidizer is added.

25. A method according to Claim 24, wherein the polymeric acid is selected from polymeric sulfonic acids, polymeric carboxylic acids, polymeric acrylic acids, polymeric phosphoric acids, and mixtures thereof.

26. A method according to Claim 24, wherein said aniline monomer has Formula I



(I)

wherein:

n is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that n + m = 5; and

R^1 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl,

alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms.

27. A method according to Claim 26 wherein m is 5.

28. A method according to Claim 24, wherein said polymeric acid is a fluorinated sulfonic acid.

29. A method according to Claim 28, wherein said polymeric acid is a perfluorinated sulfonic acid.

30. A method according to Claim 29, wherein said polymeric acid is perfluoroethylenesulfonic acid.

31. A method according to Claim 24, wherein the oxidizer is selected from ammonium persulfate, sodium persulfate, potassium persulfate, and mixtures thereof.

32. A method according to Claim 24, wherein the combination further comprises a catalyst.

33. A method according to Claim 32, wherein the catalyst is selected from ferric sulfate, ferric chloride, and mixtures thereof.

34. A method according to Claim 24, wherein the combination further comprises a co-dispersing liquid.

35. A method according to Claim 34, wherein the co-dispersing liquid is selected from ethers, alcohols, alcohol ethers, cyclic ethers, ketones, nitriles, sulfoxides, amides, and combinations thereof.

36. A method according to Claim 34, wherein the co-dispersing liquid is selected from n-propanol, isopropanol, t-butanol, dimethylacetamide, dimethylformamide, N-methylpyrrolidone, and combinations thereof.

37. A method according to Claim 24, wherein the combination further comprises a co-acid.

38. A method according to Claim 37, wherein the co-acid is selected from a water-soluble inorganic acid, a water-soluble organic acid, a colloid-forming polymeric acid, and combinations thereof.

39. A method according to Claim 34, wherein the combination further comprises a co-acid.

40. A method according to Claim 24, wherein the method further comprises contacting a reaction product with at least one ion exchange resin.

41. The method of Claim 40, wherein said at least one ion-exchange resin is selected from a cation exchange resin, anionic exchange resin, and mixtures thereof.

42. The method of Claim 40, wherein the aqueous dispersion is contacted with a cation exchange resin and then with an anionic exchange resin.

43. The method of Claims 41 and 42, wherein the cation ion exchange resin is selected from sulfonated styrene-divinylbenzene copolymers, sulfonated crosslinked styrene polymers, phenol-formaldehyde-sulfonic acid resins, benzene-formaldehyde-sulfonic acid resins, and mixtures thereof; and the anionic exchange resin is selected from tertiary-aminated styrene-divinylbenzene copolymers, tertiary-aminated crosslinked styrene polymers, tertiary-aminated phenol-formaldehyde resins, tertiary-aminated benzene-formaldehyde resins, and mixtures thereof or a quaternary amine anion exchange resin, or mixtures of these and other exchange resins.

44. A composition comprising an aqueous dispersion of a polyaniline, at least one colloid-forming polymeric acid, and an additional material selected from polymers, dyes, coating aids, carbon nanotubes, metal nanowires, organic and inorganic conductive inks and pastes, charge transport materials, crosslinking agents, and combinations thereof.

45. A composition according to Claim 44 wherein the additional material is a polymer selected from polythiophenes, polyanilines, polypyrroles, polyamines, polyacetylenes, and combinations thereof.

46. An organic light-emitting diode comprising a first buffer layer positioned between an anode and a light-emitting layer, wherein the buffer layer comprises a polyaniline and at least one colloid-forming polymeric acid.

47. An organic light-emitting diode according to Claim 46, further comprising a second buffer layer directly adjacent to the first buffer layer.

48. An organic light-emitting diode according to Claim 47, wherein the second buffer layer comprises a conductive polymer selected from polythiophenes, polyanilines, polypyrroles, polyamines, polyacetylenes, and combinations thereof.

49. An organic light-emitting diode according to Claim 48, wherein the first buffer layer is directly adjacent to the anode.

50. A multicolor display device comprising a multiplicity of at least two types of sub-pixels, each of which comprises an anode, a buffer layer,

a light-emitting material layer, and a cathode, wherein the buffer layer in each sub-pixel comprises a polyaniline and at least one colloid-forming polymeric acid, and further wherein the cathode in each sub-pixel of the device is substantially the same.

51. An organic electronic device comprising a buffer layer cast from an organic aqueous dispersion of polyaniline and at least colloid-forming polymeric acid.

52. The device of Claim 51, wherein the one polyaniline has the structure of Claim 2, and the polymeric acid is selected from the group consisting of sulfonic acids, phosphoric acids, carboxylic acids, acrylic acids and mixtures thereof.

53. The device of Claim 51 wherein said device is a photosensor, photoswitch, phototransistor, biosensor, phototube, IR detectors, photovoltaic device, solar cell, biosensors, light-emitting diode, light-emitting diode display, or diode laser.